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DATAMATION

FOR MANAGERS OF INFORMATION TECHNOLOGY WORLDWIDE

WHAT ARE YOU WORTH?

Our 1989 Salary Survey Reveals Why Network Skills Are Golden, While Programming Pays Pennies

The Grooming of
File Services: A Network
Workstations Win a Big
The Client-Server

OCT. 1, 1989

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NUMBER 19

DATAMATION

FOR MANAGERS OF INFORMATION TECHNOLOGY WORLDWIDE

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BY RALPH EMMETT CARLYLE

DATAMATION's annual salary survey indicates that IS pros will receive an average pay increase of 5.6% this year. But certain jobs are paying more. Data management and telecommunications skills, for example, are commanding raises as high as 28%. And security directors are pulling in an astounding 37% more than they did last year.

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Cover Photography by David Bradley

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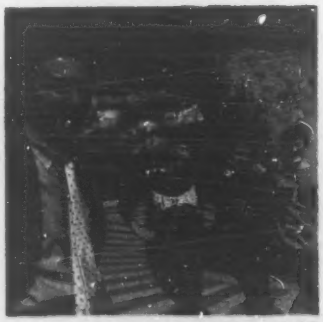

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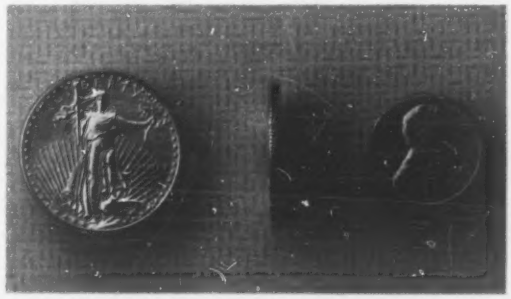
Critical Resource Management

No skill is more important to IS managers than the ability to supervise people. Advances in information technology don't mean a thing unless users of new systems and software recruit or train individuals to apply such tools to their enterprises.

The right people don't come cheap, however. Hotshot business analysts, network managers and database administrators—just a few positions in the emerging fields of IS craftsmanship—can name their price. It's a price that some users are apparently willing to pay, judging from this year's IS salary survey, the subject of "What Are You Worth?," p. 22. It's also one that has forced IS executives overseeing payrolls to make tough choices about where to find the resources to pay today's IS hotshots.

"I went through 10 years of salary survey results," says senior writer Ralph Emmett Carlyle, who crafted this issue's cover story. "At no time is it more apparent than today that the top guys who run these IS shops are making trade-offs on who gets paid what." The organizational changes, he writes, that create new jobs are part of a general shift toward networking—a transition that is now reflected in new salary and compensation structures that reward telecommunications and data management skills and deemphasize older disciplines such as operating system programming.



Photograph by Dave Bradley

WHAT SIDE of the coin are you on? Are your IS skills worth their weight in gold or pennies?

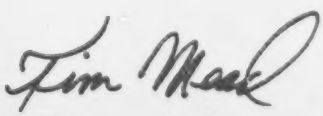
Carlyle's analysis of this year's data—generated by our research team of Nancy Gaygan, Brandt Brito and Liza Rebetz—also suggests that IS managers and professionals under their charge should take a fresh look at how they use the article's information. IS teams should examine the data with a self-critical eye.

Reaching for Excellence

Several IS teams already exhibit the capacity to expand their reach beyond the realms of yesteryear. For example:

- The members of the IS organization assembled at Motorola Inc.'s Government Electronics Group have significantly reshaped their computer-aided software engineering (CASE) strategy, which used to depend on IBM mainframe technology. It now rests on networked UNIX workstations for the most part, as senior writer Jeff Moad details in "A CASE of the Mainframe Blues," p. 37.
- Stereo component maker Bose Corp. in Framingham, Mass., is developing its own in-house set of IS skills to migrate from a host style of computing to a client-server model. Such daring can be found at other companies trying to process information cooperatively, too, as Boston bureau manager Chris Sivula finds in "The Client-Server Perspective," p. 47.
- Ed Fessler, IS manager for Weyerhaeuser Co.'s sales and marketing operations, heads up an aggressive program to recruit college talent to serve as interns in his Tacoma, Wash., division. "I'm surprised at how . . . productive these young people are," Fessler tells contributor David Stamps in "The Grooming of IS Interns," p. 67.

What is so surprising is how adept IS executives like those at Motorola, Bose, Weyerhaeuser and several of the companies evaluated in our salary survey are at managing their best IS resource—people. If these executives are the rule, not the exception, it bodes well for the profession.



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COVER STORY
SALARY SURVEY

What Are You Worth?

DATAMATION's annual salary survey indicates that IS pros will receive an average pay increase of 5.6% this year. But certain jobs are paying more, as much as 37%.

BY RALPH EMMETT CARLYLE

The IS gravy train is still rolling along, despite dire warnings of economic slumps and a rapidly maturing industry. Top computer professionals polled in DATAMATION's annual salary survey predict that the mean earnings of their staffs will climb an average 5.6% this year, a repeat of 1988, higher than the current projected annual inflation rate of 5%.

At the same time, IS executives polled in the DATAMATION survey are predicting that employee turnover will decline from last year's 8% to an average of 7.4%. Some experts take this as an indication that the industry is maturing and consolidating. But so many new IS job categories are being created by corporations that this seems unlikely. In addition to the three new positions that join the survey this year—network engineer, network administrator and microcomputer/workstation manager (a computer operations function)—there are many other new job categories that could be added in the years ahead.

Take, for example, supervisor of trade systems (or supervisor of electronic data interchange, as it is also known), a new job created at Bearings Inc. of Cleveland, which pays in the $40,000 range. Or director of artificial intelligence, a new American Express Co. position, which is in the $60,000+ range. "The industry is changing too fast to become mature. It's still a baby," says Barbara Gibbs, a senior consultant at Edward Perlin Associates Inc. of New York City, a consulting firm that tracks IS salaries. It predicts a 6.8% average increase in IS salaries this year for very large companies.

It's clear from this year's survey that the organizational changes creating the new jobs are part of a general shift from stand-alone systems toward networking, a transition that is now reflected in new salary and compensation structures that reward telecommunications and data management skills and deemphasize older disciplines such as operating system (OS) programming. Managers of and specialists in networking and databases will receive raises ranging from 16% to over 27%.

Corporations are also more security minded. As this year's most rewarded IS position, directors of security should enjoy an astounding leap of 37% in salary from $40,876 to an average of $55,875. Yet last year, salaries for this position suffered an average 9% drop in pay, making it one of 1988's biggest losers. Part of the reason for the dramatic increase in average salary is that many companies have had no prior director of security and so are uncertain what to pay. "Some are not convinced that they need such a manager," says Bearings' vice president of IS, Bryan Sanders. "They use consultants to design a security system and then maintain it as part of their existing computer architecture," he explains.

Who's Up/Who's Down

Salary Survey results show the coasts attract the biggest paychecks, while the Midwest is left dry.

Vice President, Corporate IS	
I'll Take Manhattan	$124,375
Philadelphia Freedom	112,500
Capital in Washington	87,500
1989 average:	**77,014**
Don't Leave Your Chuck in San Francisco	76,857
Not Mile High in Denver	40,000
The St. Louis Blues	31,000

At the opposite end of the spectrum are the OS programming managers and technicians, the forgotten people of this year's poll. Salaries across this group will suffer an average 21% cut. OS programming is also a virtual no-growth category at professional services companies, finds a recent survey for the Computer Software and Services Industry Association (aka ADAPSO) conducted by New York City-based research firm William M. Mercer-Meidinger Hansen Inc. (The DATAMATION salary survey covers only those IS professionals working within corporations and not those working for outside IS professional service companies.) The salaries of lead OS programmers in the outside contractor firms will grow only 1.5% this year, Mercer predicts. Average salaries for entry level OS programmers at these firms are expected to drop 22% to $23,700. "Their

Who Cashed In

Managers of and specialists in networking and databases will receive raises ranging from 16% to over 27%, but security directors enjoyed the largest hike.

	% Increase From 1988
Director of Security	**37.6%**
Communications Analyst	27.2%
Database Manager	25.8%
Communications Manager	18.1%

Steepest Slide in 1989

Operating systems managers and programmers will suffer an average 22% cut.

	% Decrease From 1988
Junior Systems Programmer	35.6%
Senior Systems Programmer	19.9%
Intermediate Systems Programmer	19.7%
Operating Systems Manager	12.5%

skill is simply not in demand," says Joyce Cain, manager of Mercer's National Survey Group. Mercer is predicting an average 5.8% increase in salaries for professionals in the computer services industry as a whole this year.

Manufacturing, Transportation Up

A rejuvenation of the nation's manufacturing sector is also revealed by the DATAMATION survey. Consumer manufacturing, in particular, is now roaring back with hefty pay increases for IS workers in virtually all categories, but especially for those with networking know-how. The task of tying together the various systems serving the shop floor, inventory control and management functions is growing ever more complex, hence the need for people with interoperability skills.

Another big boomer this year is the transportation/utility sector. And even that least automated of industries, construction, is stirring, proving to be a competitive payer in such categories as systems analysis and data management, although not yet in telecommunications. The financial services sector (apart from banking) continues to be a sluggish performer and has not yet worked the October 1987 Wall Street crash out of its system. Experts think it will improve in 1990, however. The medical and legal industries sector has proved to be an erratic performer in past surveys, punishing its IS pros one year and rewarding them the next. This year it is expected to turn on them once more. Other major findings from the survey:

- Demand far exceeds supply at both the top and the entry level of the IS career ladder. Those in the upper middle section—first- and second-level IS managers and senior technicians—can expect a poor return for their skills in the coming decade, as their areas of expertise become overcrowded.
- Systems analysts are outpacing programmer/analysts and programmers in the quest for big bucks, adding weight to government predictions that systems analysis will be one of the nation's top 20 fastest growing occupations in the 1990s.
- Education and retraining have become a top priority for IS organizations.
- Corporations are shifting their applications development workload from in-house to outside contractors, the so-called outsourcing trend.

What could be termed a two-tier salary and compensation structure seems to be the new order at IS shops. Top IS executives are suddenly in short supply and so is entry level talent. Perlin Associates reckons that computer science graduates from the Class of '89 who are now entering the work force will average $26,700 per job, an increase of 10% over last year's starting salary. The DATAMATION survey shows that other (noncomputer science) college graduates now taking entry level positions at IS organizations should command a salary in the $25,000 range, whether as junior applications programmers or junior systems analyst/programmers, up 9% from last year.

Competition for entry level talent has grown fierce, as both vendors and IS organizations compete for a diminishing number of candidates.

Senior IS executives are benefiting from being a scarce commodity at present. "Those earning more than $100,000 a year are being offered 25% pay hikes to decamp to other companies right now," says John J. Davis, principal at John J. Davis & Associates Inc., a New York City consulting firm that searches for high-priced IS talent for its corporate clients. Average salary increases at the vice president of IS level will be in the 12% range this year, according to both the DATAMATION and Perlin surveys.

"While everybody is looking for top VP [of IS] ex-

Old-Line Industries Storm the Ladder

The least automated sectors are starting to require networking, systems analysis and data management.

Consumer Manufacturing	
Corporate Vice President	$114,000
Communications Manager	66,000
Transportation/Utility	
Corporate Vice President	107,500
Communications Manager	61,000

Education, Government Learn the Hard Way

These traditionally underappreciated sectors remain low on the payscale.

Education	
Corporate Vice President	$38,000
Communications Manager	40,000
Government	
Corporate Vice President	61,400
Communications Manager	40,250

Source: DATAMATION Salary Survey

Average Salary by Region (in $)

	ALL 1988	ALL 1989	% CHG +/-	BOSTON	MANHAT	NYC AREA	PHILA	WASH/ BALT	ATLANTA
CORPORATE STAFF									
Vice President	67,643	77,014	13.9	70,000	124,375	90,000	112,500	87,500	75,000
Director of DP MIS	54,189	56,204	3.7	50,286	116,333	65,464	69,333	68,125	56,000
Technical Services Manager	56,859	56,395	-0.1	35,000	102,500	79,000	59,333	57,500	57,000
Information Center Data Center Manager	42,203	45,417	7.6	39,000	87,500	53,400	53,140	52,000	44,000
Director of Security	40,876	55,875	36.7	N/A	65,000	66,500	70,000	59,500	N/A
SYSTEMS ANALYSIS									
Manager	45,561	50,666	11.2	43,500	63,333	57,500	58,000	54,500	40,000
Senior Systems Analyst	41,518	44,299	6.7	35,730	50,000	47,833	51,000	48,333	35,000
Lead Systems Analyst	37,067	41,118	10.9	37,399	N/A	44,250	39,900	52,500	N/A
Systems Analyst	33,446	35,403	5.9	32,333	45,000	36,333	37,467	41,000	N/A
Junior Systems Analyst	27,599	30,316	9.8	27,000	N/A	30,250	34,000	42,000	N/A
APPLICATIONS PROGRAMMING									
Manager	45,581	49,164	7.9	41,625	N/A	42,400	54,000	56,625	35,000
Lead Application Programmer	38,269	41,764	9.1	39,575	50,000	39,857	43,333	49,400	25,000
Senior Application Programmer	36,397	36,669	0.7	39,000	N/A	39,800	32,000	45,000	20,500
Application Programmer	28,493	30,856	8.3	34,909	N/A	33,000	33,425	40,833	18,000
Intermediate Application Programmer	26,127	28,562	9.3	35,000	N/A	32,333	38,000	36,500	N/A
Junior Application Programmer	22,947	24,257	5.6	30,000	N/A	27,500	27,075	30,000	N/A
SYSTEMS ANALYSIS/PROGRAMMING									
Manager	51,316	50,547	-1.5	48,500	76,000	54,750	46,500	55,000	43,750
Lead Systems Analyst/Programmer	42,430	42,552	0.3	42,333	52,333	47,620	44,000	50,000	36,000
Senior Systems Analyst/Programmer	38,974	38,070	-2.3	38,000	40,000	44,458	38,833	45,000	38,333
Systems Analyst/Programmer	30,926	33,062	6.9	33,450	36,500	39,000	45,000	36,667	33,000
Intermediate Systems Analyst/Programmer	28,079	30,733	9.5	32,000	37,000	29,250	42,000	42,500	30,000
Junior Systems Analyst/Programmer	23,620	25,871	9.5	25,500	30,000	25,600	40,000	33,333	25,000
OPERATING SYSTEMS PROGRAMMING									
Manager	57,351	50,156	-12.5	47,667	N/A	60,600	59,000	62,500	45,000
Senior Systems Programmer	57,846	46,315	-19.9	40,000	59,000	56,000	43,500	56,750	45,000
Intermediate Systems Programmer	47,940	38,488	-19.7	33,500	40,300	45,000	37,500	45,333	40,000
Junior Systems Programmer	47,462	30,547	-35.6	29,000	N/A	32,000	40,000	34,567	25,000
DATABASE ADMINISTRATION									
Manager	41,649	52,409	25.8	N/A	78,000	N/A	57,500	52,500	50,000
Database Administrator	36,579	42,307	15.7	N/A	N/A	30,000	48,500	50,000	40,000
DATACOM/TELECOM/CONNECTIVITY									
Manager	46,005	54,350	18.1	55,000	75,000	66,500	66,500	56,250	44,000
Analyst	33,998	43,242	27.2	41,500	58,500	35,000	51,000	56,500	40,000
Network Engineer	N/A	41,211	N/A	N/A	39,000	40,000	45,000	53,250	38,000
Network Administrator	N/A	33,175	N/A	N/A	29,000	32,000	40,000	43,333	30,000
COMPUTER OPERATIONS									
Manager	37,072	36,578	-1.3	40,000	54,000	48,200	47,000	41,714	39,333
Shift Supervisor	30,827	32,074	4.0	27,859	31,000	35,250	38,500	40,333	33,500
Lead Computer Operator	24,464	25,544	4.4	28,500	27,000	29,143	29,100	40,000	26,500
Computer Operator	21,346	20,716	-3.0	21,400	22,000	22,500	29,500	29,750	21,500
Microcomputer/Workstation Manager	N/A	30,053	N/A	18,000	N/A	21,000	28,500	55,000	N/A
PRODUCTION AND I/O CONTROL									
Supervisor	29,016	32,988	13.7	32,000	N/A	34,333	39,000	35,000	N/A
Lead Production Controller	26,433	31,269	18.3	N/A	N/A	25,000	37,000	38,000	N/A
Scheduler	24,493	25,130	2.6	24,000	N/A	20,000	N/A	27,500	N/A
Control Clerk	21,127	20,330	-3.8	14,000	20,000	20,000	29,700	30,000	N/A
DATA ENTRY									
Supervisor	22,898	24,005	4.8	21,000	N/A	27,833	21,333	45,500	25,667
Operator	16,838	17,431	3.5	17,580	18,500	17,854	16,750	22,500	18,000
OFFICE AUTOMATION									
Word-Processing Supervisor	23,822	29,980	25.9	20,000	N/A	36,500	35,000	36,500	N/A
Word-Processing Operator	17,930	19,347	7.9	15,000	N/A	23,500	24,000	26,500	N/A
Microcomputer User Services Specialist	25,054	27,783	10.9	27,500	N/A	24,333	29,000	35,900	18,000
OTHER									
Specialists	24,828	28,916	16.5	40,000	38,000	45,000	41,000	35,000	N/A
Consultant	48,810	49,433	1.3	80,000	N/A	55,500	45,000	45,000	N/A
PC Evaluator	32,127	33,438	4.1	23,000	N/A	35,000	50,000	35,000	N/A

CHI	MINN/ ST. PL	CLEVE	CINN	DTRT	ST. LOU	HOUS-TON	DENVER	DALLAS	SEATL	SAN FRAN	LOS ANGEL
62,097	68,500	N/A	N/A	N/A	31,000	60,000	40,000	71,333	60,000	76,857	53,000
55,750	54,000	41,002	42,000	43,000	42,000	75,200	56,667	54,857	35,000	48,700	63,722
52,500	45,000	N/A	49,000	39,000	N/A	N/A	N/A	54,000	N/A	62,000	77,500
54,167	45,200	N/A	34,500	50,000	45,000	28,000	36,000	48,833	N/A	67,500	50,916
35,000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	42,000	N/A	N/A	N/A
51,388	43,000	66,000	32,500	52,000	45,000	65,000	N/A	34,000	40,000	67,000	71,667
66,500	38,000	44,018	N/A	47,000	N/A	41,333	N/A	34,400	N/A	45,520	46,857
35,167	37,667	N/A	N/A	47,000	N/A	N/A	N/A	41,000	N/A	46,000	53,244
39,450	31,000	28,500	25,000	35,000	N/A	35,000	N/A	38,000	25,000	42,000	38,500
30,000	N/A	N/A	27,000	N/A	N/A	N/A	N/A	17,000	N/A	N/A	35,000
55,000	55,000	N/A	45,000	52,000	43,000	70,000	32,500	N/A	N/A	71,667	90,000
37,500	N/A	N/A	36,000	52,000	37,500	53,000	32,500	40,000	28,000	50,250	75,000
36,333	35,500	25,000	30,000	50,000	N/A	30,850	30,000	38,500	N/A	43,000	44,333
38,000	26,667	N/A	24,000	42,000	32,000	26,400	24,000	28,500	24,000	35,500	42,500
27,500	17,000	N/A	20,500	N/A	N/A	23,000	N/A	N/A	N/A	N/A	35,000
26,667	23,000	N/A	18,000	35,000	27,500	20,100	N/A	21,000	N/A	26,000	23,000
45,833	49,500	N/A	31,000	41,000	N/A	56,000	44,000	47,333	N/A	65,000	70,500
37,500	N/A	N/A	N/A	41,000	N/A	42,000	36,850	36,200	N/A	38,116	59,000
38,667	33,000	N/A	30,000	31,000	N/A	37,100	N/A	36,500	32,400	41,200	60,000
33,929	29,500	N/A	27,333	26,000	N/A	37,250	N/A	31,667	N/A	31,000	42,500
28,000	N/A	N/A	N/A	N/A	N/A	29,700	25,750	28,000	N/A	N/A	45,000
22,000	N/A	N/A	N/A	N/A	N/A	25,800	21,200	22,000	N/A	N/A	35,000
46,000	32,000	N/A	35,600	N/A	N/A	N/A	33,500	47,000	N/A	75,000	68,500
37,900	N/A	N/A	N/A	57,000	N/A	43,600	29,250	39,333	N/A	56,500	62,500
39,250	N/A	15,600	27,500	N/A	N/A	39,400	N/A	37,667	N/A	N/A	55,000
N/A	N/A	N/A	N/A	N/A	N/A	35,300	20,000	28,000	N/A	N/A	50,000
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	70,000	95,000
45,000	34,000	N/A	N/A	N/A	N/A	46,850	N/A	37,000	17,500	44,333	65,500
25,000	36,667	N/A	N/A	N/A	N/A	N/A	N/A	67,500	35,000	64,750	90,000
35,300	37,000	34,000	N/A	N/A	N/A	N/A	N/A	28,500	N/A	52,500	75,000
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	35,000	N/A	49,500	60,000
N/A	24,00	N/A	N/A	N/A	N/A	N/A	N/A	32,500	N/A	41,500	50,000
41,400	35,750	31,000	30,000	N/A	N/A	39,400	28,000	32,500	41,000	44,700	45,125
32,725	26,000	N/A	N/A	N/A	N/A	38,000	N/A	28,333	N/A	30,250	38,900
23,167	24,400	N/A	25,750	N/A	25,000	19,400	22,000	26,189	20,000	32,902	28,333
21,129	17,850	14,950	20,000	18,000	18,550	20,033	17,267	19,667	29,833	25,667	20,512
N/A	N/A	N/A	N/A	N/A	N/A	N/A	28,000	22,000	N/A	N/A	35,000
N/A	30,000	N/A	34,400	N/A	N/A	N/A	N/A	41,000	22,000	40,000	34,000
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	27,500	N/A	N/A	40,000
N/A	28,000	27,000	N/A	N/A	N/A	N/A	N/A	26,000	N/A	N/A	35,000
20,000	N/A	18,000	N/A	N/A	N/A	22,000	N/A	N/A	17,000	N/A	25,000
20,000	24,734	10,000	17,000	28,000	23,000	N/A	N/A	33,000	18,000	22,000	23,471
18,425	16,510	16,240	17,800	18,000	16,000	N/A	13,000	20,467	20,000	23,400	16,700
N/A	N/A	N/A	N/A	N/A	N/A	N/A	26,500	30,500	N/A	32,000	30,000
18,400	15,000	N/A	18,500	N/A	N/A	N/A	18,000	20,000	18,000	21,250	22,000
N/A	24,333	N/A	N/A	N/A	N/A	N/A	23,500	22,000	N/A	28,000	30,000
N/A	28,000	N/A	N/A	N/A	N/A	N/A	25,000	19,000	N/A	22,000	45,000
65,000	10,000	N/A	N/A	N/A	N/A	N/A	10,000	41,000	N/A	45,000	60,000
N/A	N/A	N/A	N/A	N/A	N/A	N/A	25,000	37,000	N/A	40,000	60,000

Average Salary by Industry (in $)

	1988	1989	% CHG +/−	CONSUM MFG	INDUS MFG	BANK	FINAN	EDP SERV	DISTRIB
CORPORATE STAFF									
■ Vice President	67,643	77,014	13.9	114,000	88,000	77,207	69,833	68,750	66,667
■ Director of DP MIS	54,189	56,204	3.7	60,976	54,222	91,600	54,167	67,500	55,500
■ Technical Services Manager	56,859	56,395	−0.1	65,429	56,500	75,667	52,667	67,500	55,000
■ Information Center/Data Center Manager	42,203	45,417	7.6	55,764	42,390	78,333	48,283	47,000	40,583
■ Director of Security	40,876	55,875	36.7	66,667	N/A	61,500	42,000	N/A	N/A
SYSTEMS ANALYSIS									
■ Manager	45,561	50,666	11.2	52,429	48,682	59,450	51,000	44,000	51,667
■ Senior Systems Analyst	41,518	44,299	6.7	44,833	42,463	54,214	40,250	44,674	41,667
■ Lead Systems Analyst	37,067	41,118	10.9	45,000	40,797	48,000	41,233	42,882	40,000
■ Systems Analyst	33,446	35,403	5.9	42,200	29,636	37,000	34,480	42,044	36,500
■ Junior Systems Analyst	27,599	30,316	9.8	31,000	31,750	35,000	24,000	28,000	N/A
APPLICATIONS PROGRAMMING									
■ Manager	45,581	49,164	7.9	52,263	53,000	41,500	55,000	43,826	N/A
■ Lead Application Programmer	38,269	41,764	9.1	39,000	45,889	48,000	41,000	43,218	35,000
■ Senior Application Programmer	36,397	36,669	0.7	33,000	33,429	45,000	40,667	43,258	34,667
■ Application Programmer	28,493	30,856	8.3	34,429	30,038	38,000	29,740	29,965	26,067
■ Intermediate Application Programmer	26,127	28,562	9.3	23,986	31,000	34,000	17,000	30,383	30,000
■ Junior Application Programmer	22,947	24,257	5.6	25,333	24,556	22,500	24,750	23,175	24,000
SYSTEMS ANALYSIS/PROGRAMMING									
■ Manager	51,316	50,547	−1.5	46,571	50,050	52,083	53,000	52,714	40,000
■ Lead Systems Analyst/Programmer	42,430	42,552	0.3	38,225	48,167	45,700	35,500	47,900	41,750
■ Senior Systems Analyst/Programmer	38,974	38,070	−2.3	32,660	36,333	40,000	34,250	37,594	36,467
■ Systems Analyst/Programmer	30,926	33,062	6.9	31,050	31,560	33,400	31,250	31,333	34,000
■ Intermediate Systems Analyst/Programmer	28,079	30,733	9.5	24,917	30,000	30,750	24,767	30,000	28,000
■ Junior Systems Analyst/Programmer	23,620	25,871	9.5	22,050	26,500	25,667	21,667	18,000	25,000
OPERATING SYSTEMS PROGRAMMING									
■ Manager	57,351	50,156	−12.5	52,000	49,188	51,750	49,000	60,000	41,500
■ Senior Systems Programmer	57,846	46,315	−19.9	46,607	42,462	54,667	38,000	N/A	46,500
■ Intermediate Systems Programmer	47,940	38,488	−19.7	38,000	32,456	45,100	36,333	N/A	38,000
■ Junior Systems Programmer	47,462	30,547	−35.6	24,333	26,500	25,350	29,000	24,000	32,000
DATABASE ADMINISTRATION									
■ Manager	41,649	52,409	25.8	52,333	56,400	55,000	57,500	N/A	78,000
■ Database Administrator	36,579	42,307	15.7	44,667	42,625	29,000	N/A	35,000	17,500
DATACOM/TELECOM/CONNECTIVITY									
■ Manager	46,005	54,350	18.1	66,000	61,667	47,667	46,500	N/A	N/A
■ Analyst	33,998	43,242	27.2	37,333	28,575	39,125	31,500	N/A	N/A
■ Network Engineer	N/A	41,211	N/A	54,000	40,000	37,250	28,500	N/A	N/A
■ Network Administrator	N/A	33,175	N/A	32,667	32,500	24,750	25,500	N/A	N/A
COMPUTER OPERATIONS									
■ Manager	37,072	36,578	−1.3	39,136	37,733	35,278	25,529	42,000	39,171
■ Shift Supervisor	30,827	32,074	4.0	31,429	35,100	28,100	26,200	N/A	28,250
■ Lead Computer Operator	24,464	25,544	4.4	22,719	25,714	21,750	22,117	20,000	26,750
■ Computer Operator	21,346	20,716	−3.0	20,231	20,223	18,789	17,527	22,667	22,982
■ Microcomputer/Workstation Manager	N/A	30,053	N/A	22,000	30,000	28,000	N/A	28,000	N/A
PRODUCTION AND I/O CONTROL									
■ Supervisor	29,016	32,988	13.7	40,000	40,000	27,750	33,000	N/A	23,000
■ Lead Production Controller	26,433	31,269	18.3	33,333	26,000	24,667	29,000	N/A	N/A
■ Scheduler	24,493	25,130	2.6	24,000	31,000	20,833	26,666	N/A	N/A
■ Control Clerk	21,127	20,330	−3.8	22,667	24,000	18,333	12,500	N/A	N/A
DATA ENTRY									
■ Supervisor	22,898	24,005	4.8	22,000	22,412	21,167	24,000	19,650	18,500
■ Operator	16,838	17,431	3.5	17,618	18,795	13,900	14,420	16,600	17,067
OFFICE AUTOMATION									
■ Word-Processing Supervisor	23,822	29,980	25.9	29,750	24,000	30,667	39,000	30,000	N/A
■ Word-Processing Operator	17,930	19,347	7.9	14,500	20,550	18,750	15,400	20,000	19,000
■ Microcomputer User Services Specialist	25,054	27,783	10.9	22,000	36,500	26,500	22,000	22,000	32,500
OTHER									
■ Specialists	24,828	28,916	16.5	22,500	23,000	33,833	23,500	35,000	N/A
■ Consultant	48,810	49,433	1.3	35,000	45,000	80,000	N/A	79,500	10,000
■ PC Evaluator	32,127	33,438	4.1	32,333	N/A	27,500	26,000	N/A	N/A

GOVT	MED/ LEGAL	TRANS/ UTIL	EDUCA	CONSTR/ MIN/AGRI	ANNUAL SPENDING <$1 MIL	>$1 MIL
61,400	85,000	107,500	38,000	60,000	60,357	92,953
47,404	51,600	72,833	42,950	57,500	46,672	70,932
41,483	47,500	60,000	30,000	55,000	47,133	59,482
40,183	34,625	54,000	30,200	34,333	38,536	54,343
46,833	N/A	85,000	N/A	43,000	39,000	59,769
46,000	**55,000**	**54,333**	**41,325**	**58,333**	**43,884**	**55,976**
41,252	**40,000**	**56,000**	**26,667**	**46,000**	**41,126**	**46,581**
39,040	**N/A**	**45,000**	**26,000**	**N/A**	**36,592**	**44,750**
37,000	**30,000**	**37,400**	**33,500**	**N/A**	**32,393**	**37,773**
28,667	**N/A**	**31,000**	**N/A**	**N/A**	**30,750**	**30,214**
50,333	45,000	50,500	20,000	N/A	42,100	55,911
42,222	N/A	44,833	27,000	43,000	38,302	45,300
37,778	32,667	N/A	25,000	32,000	32,183	41,444
32,686	28,333	31,825	18,000	27,333	26,574	34,665
27,250	25,000	34,000	25,[illegible]0	N/A	24,902	30,516
25,248	20,000	29,750	15,033	20,000	22,369	25,905
49,429	**40,000**	**55,500**	**50,500**	**55,000**	**44,797**	**55,028**
40,493	**35,000**	**50,400**	**18,000**	**38,750**	**38,398**	**45,990**
39,333	**35,000**	**45,800**	**36,800**	**37,000**	**35,131**	**40,056**
35,829	**31,250**	**37,486**	**28,167**	**36,500**	**30,239**	**35,103**
32,500	**N/A**	**34,750**	**N/A**	**28,500**	**26,554**	**32,987**
26,533	**20,000**	**29,600**	**N/A**	**24,500**	**22,756**	**22,996**
43,800	37,250	58,250	40,000	N/A	38,364	54,480
46,750	35,500	52,667	30,000	46,000	38,400	48,795
34,250	N/A	43,600	N/A	40,000	26,888	42,318
38,000	25,000	40,000	N/A	N/A	24,283	33,892
48,500	**30,000**	**52,500**	**30,000**	**N/A**	**42,750**	**54,556**
40,661	**N/A**	**44,000**	**35,000**	**45,500**	**30,786**	**44,703**
40,250	N/A	61,000	40,000	43,000	32,500	58,720
57,400	N/A	45,500	N/A	39,000	32,300	45,729
57,500	N/A	41,500	21,500	28,500	41,500	41,156
39,951	N/A	31,667	N/A	N/A	29,750	33,518
31,933	**31,000**	**53,333**	**30,714**	**45,500**	**30,437**	**43,482**
32,127	**N/A**	**39,000**	**N/A**	**38,000**	**28,186**	**33,841**
28,346	**26,667**	**26,795**	**26,500**	**26,000**	**23,044**	**28,523**
22,019	**19,857**	**28,920**	**18,800**	**22,000**	**19,066**	**22,781**
33,467	**N/A**	**41,000**	**N/A**	**N/A**	**N/A**	**31,331**
30,667	30,000	41,000	33,000	N/A	28,000	33,441
38,000	N/A	42,000	N/A	28,500	26,000	31,708
24,900	20,000	N/A	N/A	N/A	27,000	24,996
21,543	N/A	23,150	15,000	22,000	20,933	20,139
35,875	**N/A**	**31,250**	**24,617**	**17,000**	**20,929**	**27,604**
18,110	**18,500**	**19,250**	**19,256**	**17,180**	**16,513**	**20,056**
32,667	32,000	35,000	25,000	N/A	26,750	31,500
20,750	21,750	24,000	21,000	14,533	18,449	20,638
28,362	25,000	37,000	22,000	30,000	22,955	30,312
31,825	**N/A**	**41,000**	**26,000**	**24,000**	**23,039**	**30,463**
45,750	**N/A**	**45,000**	**27,800**	**N/A**	**47,817**	**52,667**
35,000	**N/A**	**50,000**	**28,500**	**N/A**	**32,333**	**33,692**

ecutive talent and bright youngsters at the entry level, there's less demand for what's in the middle," says Dave Flansbaum, a veteran recruiter of IS professionals. Adds Flansbaum, who is managing director for the northern California region at nationwide IS recruiter Source EDP in San Francisco, "The middle is being squeezed."

Flansbaum calls the people suffering this indignity the "historians" of the profession. They are the members of the baby boom generation, men and women in their 30s and early 40s that manage, modify and maintain existing mainframe- and minicomputer-based systems. Their careers flourished in the 1970s when their companies were getting the first of these machines. But over the years, they have become identified with these now-aging code museums and not with the businesses that employ them. That has diminished their marketability outside their companies.

They are the growing residue that didn't make it to the top of the IS career ladder. Over the years, they have settled into first- and second-level management positions or became senior technicians.

A Psychological Barrier

Over the past decade of DATAMATION surveys, the salary of IS vice presidents has doubled. The historians have also prospered, with gains in the 60 to 70% range, depending on specialty. But, over the past three surveys, it's been a different story. Salaries of IS VPs have climbed 20%, and entry level salaries have risen 25% over the period. But managers of such areas as applications programming and systems analysis—even directors of DP/MIS—have only scored 11 to 12% gains over that same period.

The new hot position of manager telecom/datacom realized a 16.4% salary increase over the same three-year period. And even the manager of database administration made more than his peers in programming and systems analysis on this year's survey. Senior and lead technicians in the historian group face an additional challenge, especially in small or midsized companies. "There's a psychological barrier," says Flansbaum. "These smaller concerns are reluctant to pay $50,000 and up to anyone that doesn't have the title 'manager.' "

These historians, especially those with an OS programming or analyst/programmer speciality, whether managers or technicians, are the big losers—the only losers—in an otherwise very positive salary survey. Factor them out, and the overall average salary increase would climb to around 8%.

Systems Analysts in Demand

One group doing well is systems analysts. "That's because the career path we're emphasizing is systems analyst to business analyst," says Marilyn Smith, second vice president and section information officer for the retail information services unit of The John Hancock Mutual Life Insurance Co., based in Boston. Smith says that programmers working in COBOL and other third-generation languages will still be around for a long time, but the move to fourth-generation languages (4GLs) and computer-

aided software engineering (CASE) tools is accelerating.

"We no longer have any jobs with [the word] *programmer* in the title," says Robert Berger, director of IS at Central Hudson Gas & Electric Corp. in Poughkeepsie, N.Y. He adds that 95% of all his programming is currently done in 4GLs and that the shift in the industry is to rules-based languages and 4GLs made more palatable to nontechnical programmers by an infusion of expert system or CASE technology into their structures.

The historians are not just the victims of a two-tier salary focus; they, and maybe the whole classical IS organization, are threatened by another emerging trend—outsourcing. IS executives compelled to deliver end solutions, not only at the right price but with more business know-how than they may have needed before, are turning to outsiders.

Five years ago, the average number of contract and part-time staff members on the payroll of the average company was 4.8 persons. This year, that number has grown to 14.1. Bear in mind that the average number of full-time employees per site will this year be around 50, less than it was five years ago, and you begin to get the picture.

As outsourcing accelerates, job turnover is declining at IS organizations, meaning, perhaps, that many of these IS workers will get stuck in humdrum jobs. To combat this, IS shops are turning with a vengeance to education and retraining. Last year, the average IS employee was given 107 hours of training at an estimated cost of $3,092. That's a big increase over the previous mark of 64 hours and $2,800.

This year's DATAMATION salary survey also reveals that perks remain an important method of boosting morale and improving the IS worker's lot. But there has been little change in the types of benefits offered over the years. Perhaps the biggest change over last year is an increase in stock options. These are now available in 23.5%, as opposed to 20%, of cases. Equity is often a lure to IS talent joining software companies or new technology ventures.

I'll Take Manhattan

Corporations will continue to offer exotic locations to the talent they most prize. But Source EDP's Flansbaum warns that regional differences in salaries aren't as sharp as they once were. "You should move to the San Francisco Bay area because you want to live there, not because the salaries seem higher. Factor in the cost of living, and you're no better off than if you were in Houston or Detroit," he says. A glance at salaries by region reveals that, as expected, Los Angeles and Manhattan are the big payers. The East Coast offers higher salaries to high-level corporate staffers. The West Coast is better for most other categories.

In any event, IS professionals in search of top salaries must always choose their industries with great care. Across the board, ISers in the field of education earn considerably less than average; those in transportation/utilities, manufacturing, electronic data processing services and financial services, considerably more.

The odds are, however, that in whichever industry or region IS workers find themselves this year, they'll be better paid than the typical U.S. worker. Nonagricultural workers employed by private industry in the United States earn less than $18,000 a year on average. Only one of the 49 job categories in the DATAMATION survey—data entry operator ($17,431)—reported a mean salary of less than $18,000. While it's true that IS workers are threatened by outsourcing and other perils, for this year, at least, they're still aboard the gravy train. ▭

Methodology

On June 7, 1989, 3,000 questionnaires were mailed to a random sample of DATAMATION subscribers. The sample selected was made up of the top IS individual (or "key man per site") in each of 2,010 general sites and 990 *Fortune* 1,000 companies. The sample selection was on an "nth-name" basis from a list of those that qualified. That is, names were selected at a specified interval throughout the list (say, every fifth name, or every ninth name), so that a systematic random sample of the entire list resulted. To achieve the highest possible response rate, each outgoing envelope was personally addressed to the recipient, and a $1 bill and prepaid envelope were included to facilitate return of the completed questionnaire. By July 7, 344 completed questionnaires had been returned, for a response rate of 11.5%. The results were tabulated, and this report was based on the data from the 344 replies.

IS Job Descriptions and Levels

Job Descriptions

The following is the job description guide used by respondents to the survey.

Corporate staff: reports to senior management within corporation.

Applications programming: develops, designs and prepares programs.

Systems analysis/programming: performs systems analysis and applications programming.

Operations systems programming: programs and maintains systems software.

Database administration: plans, organizes and schedules the activities of the database section; establishes standards, maintains dictionary.

Datacom/telecom: develops and designs datacom networks and the installation and operation of data lines.

Computer operations: in charge of equipment, data entry, production control and postprocessing, but not systems analysis, or other development functions.

Production and I/O control: sets up and schedules jobs for processing so as to maximize utilization and meet turnaround requirements.

Data entry: performs data entry and verification functions.

Office automation: operates word-processing equipment, intelligent typewriters and terminals for text editing/word processing.

Job Levels

Manager: Requires an advanced degree and a minimum of five years' experience or equivalent combinations. Performs personnel evaluations, budgeting, progress reporting and project management.

Lead: Requires a bachelor's degree or equivalent and a minimum four years' experience (two in supervisory capacity). Performs supervision as a project manager.

Senior: Requires a bachelor's degree or equivalent and a minimum three years' experience. Includes some supervisory functions.

Intermediate: Requires a bachelor's degree or equivalent and a minimum two years' experience. Requires some direction.

Junior: Requires two to four years' college and six months' experience. Needs direct supervision.

The New Unisys Approach

The $9.9 billion computer maker is trying to hang onto its existing customers and make new converts by giving them an environment that protects their systems investments.

BY RALPH EMMETT CARLYLE

A new five-year plan from Unisys Corp. has an original twist. The world's fifth-largest computer maker thinks the best way to hold onto its proprietary mainframe system customers is to give them more chances to leave its private domain.

Sound crazy? The plan's two architects don't think so. Nor do several existing Unisys customers regard it as outlandish, though many do express reservations about following the plan. What makes sense to both seller and buyer is the foundation on which the world's number five computer maker is trying to build its future—software.

Unisys is offering its customers very high-level software that will allow them to escape—in a sense—from the proprietary provinces of Burroughs Corp. and Sperry Corp., the two companies that merged to form Unisys in 1986 and whose mainframe architectures dominate the high end of its product line. The escape route even may lead users to machines made by Unisys' nemesis, IBM.

Visions of a New World

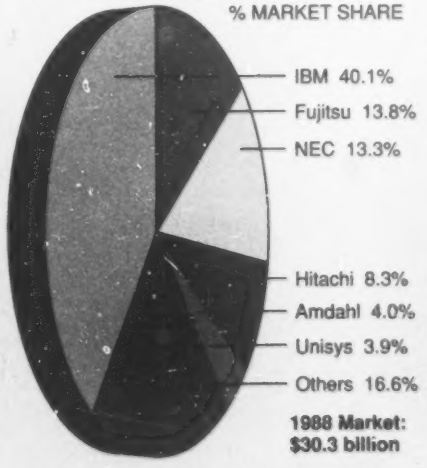
"We intend to offer our customers the opportunity to look through one of our 4GLs [fourth-generation languages] and say, 'Bang! It's there. That's the IBM world,' " says Jim Murtaugh, vice president of engineering at Unisys. He and coarchitect David Dreschel, vice president of mainframe program management, believe Big Blue has even helped their construction efforts by consolidating IBM software development around one plan—Systems Application Architecture (SAA).

Make no mistake: Unisys does not want to sell IBM equipment. What it does want, however, is to help create a world in which all systems integrators and software creators write to the same set of machine independent interfaces. To help usher in that new day of computing, Unisys has:

- Become a driving force in the open systems movement and its favorite operat-

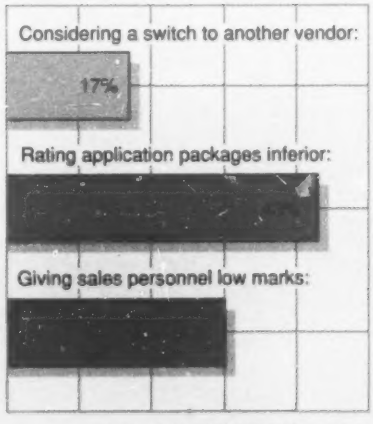
Why the Environmental Approach?

Unisys needs to expand beyond its narrow mainframe base...



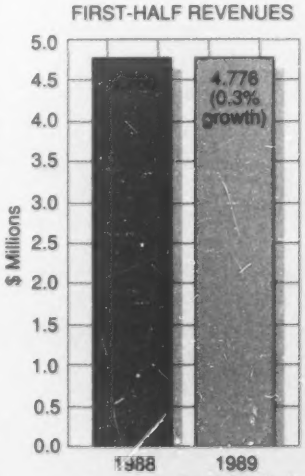
Source: DATAMATION 100.

To shore up customer dissatisfaction...


% OF UNISYS USERS
Considering a switch to another vendor:
17%
Rating application packages inferior:
Giving sales personnel low marks:

Source: 1989 DATAMATION/Cowen & Co. Large-Scale Systems Survey.

And to boost sales.



Source: Dow Jones.

ing system, UNIX.

- Supported the Portable Operating Systems Interface (POSIX) standard, which doesn't just insist on UNIX but allows proprietary operating systems to proliferate behind its open interface.
- Developed its own high-level software platform that it refers to internally as the Solutions Generation Environment (SGE), an all-encompassing term for the 4GL and computer-aided software engineering (CASE) products that the company has developed through the years.

SGE represents an attempt to create synergies beyond what any of Unisys' three computer architectures—Sperry, Burroughs and UNIX—can do on their own. Customers reveal that the software productivity tool LINC, originally a product of the Burroughs environment, has just begun to ship to Sperry test sites for evaluation on their systems. By the end of the year, LINC will be offered to UNIX customers, too. MAPPER, the equally popular Sperry-based 4GL, has just been offered to Burroughs customers and already runs on UNIX systems. IBM will be next.

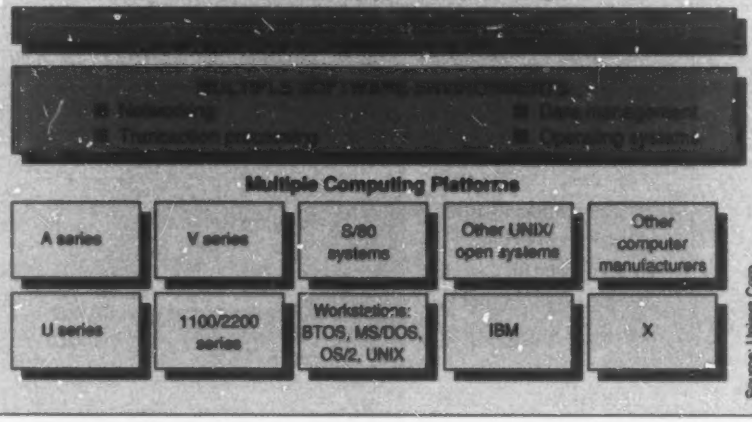
Not Just Another Environment

Unisys describes SGE and POSIX as key elements of a strategy in which users and the company both win without exposing themselves to risk. "It's our attempt to overcome the fear independent software vendors have; namely, that our installed base is too small," says Murtaugh. Unisys wants resellers to feel that they can choose a Unisys mainframe over IBM's if the systems to which they add value require such a computer. It's hard to engender such feelings, however, because Unisys' nearly 4% share of worldwide mainframe sales pales in comparison to IBM's 40% portion.

"All they [solution sellers] see is the risk," says Dreschel. The new Unisys is hoping to find a lot more companies like Ferranti International Controls Corp. of Sugar Land, Texas. This value-added reseller (VAR) is now repackaging Unisys 1100 and 2200 model mainframes for resale to the utilities industry with its own database and applications.

Environmental Issues

Unisys' real intent in pushing the Solutions Generation Environment is to create a common interface for its customers, regardless of what or whose equipment they are using.



Source: Unisys Corp.

In the past, Unisys wasn't very good at dealing with VARs, says George Wolf, a support group manager at Ferranti. But he gives company executives credit for trying to improve relations. "They try to accentuate the positive. And their high-level software orientation is very positive," he says.

☐ UNISYS CORP. WANTS INTEGRATORS TO OVERCOME THEIR FEARS OF SELLING ITS MAINFRAMES.

Some customers seem intrigued by what they're seeing these days from Unisys, though others continue to express dissatisfaction with the company. One in six Unisys customers, in fact, has been considering a jump to another vendor, according to last spring's large-scale systems survey by DATAMATION and Cowen & Co. A source of their discontent is the very thing Unisys is attempting to remedy—a lack of applications software.

"Many times it seems as though the rest of the world speaks one language and we speak another," says Dennis Blondell, assistant director of operations at Floral Network of Chicago, referring to the dearth of industry-specific software applications for his company's Unisys systems. "We've had to try and protect ourselves and free ourselves a bit," he adds. Though a MAPPER customer and aware of SGE, Blondell's division (part of the world's largest floral order and distribution center, Florists' Transworld Deliveries of Southfield, Mich.) intends to write its core mission critical programs in the C language, which is growing in popularity among software developers because of its portability features.

Customer Skepticism

The National Trust Bank in Toronto, one of Canada's top five banks, is also planning to go the C route. "Our Unisys mainframes will become more like fileservers as we shift more of the future applications work load to UNIX workstations," says John Ambrose, senior vice president of information systems. He regards MAPPER as a computer resources hog, worrying aloud that adopting its SGE parent could even double or triple the size of his data center configurations.

Roy Graham, an IS manager across town from Ambrose at Ontario Blue Cross, agrees that SGE will be a hog of sorts, but says that the cost of mainframe computing is dropping 20% a year to offset such fears. He sees SGE as a chance to turn his programmers into business analysts and to draw more nontechnical workers into software creation.

Some customers are already wedded to LINC. For example, at Liberty Travel Service in Paramus, N.J., all the company's mission critical systems have been written in LINC's 4GL form. Some say that Liberty vice president of MIS Bob Dever has allowed his company to escape hardware enslavement only to become a prisoner of the new Unisys software. Perhaps that's why one of his most fervent hopes is that independent software vendors become as enamored of SGE as he is and write a ton of new applications in its languages.

While it's too early to tell whether SGE will be accepted by most customers, it's not hard to determine what the environmental emphasis signifies. Unisys wants to be viewed primarily as a software and solutions seller. Further, one that can plug and play in any combination of hardware and programs the customer should desire. ▭

Short-Circuiting Computer Crime

Assessing what other IS managers are doing to safeguard computer systems is probably the best source of ideas on how to shut down computer crime, a $500 million a year industry.

BY J.J. BLOOMBECKER

What can the computer professional do to minimize the likelihood of being victimized by the ever present threat of computer crime and then being held accountable by upper management or end users for the breach in the system defenses?

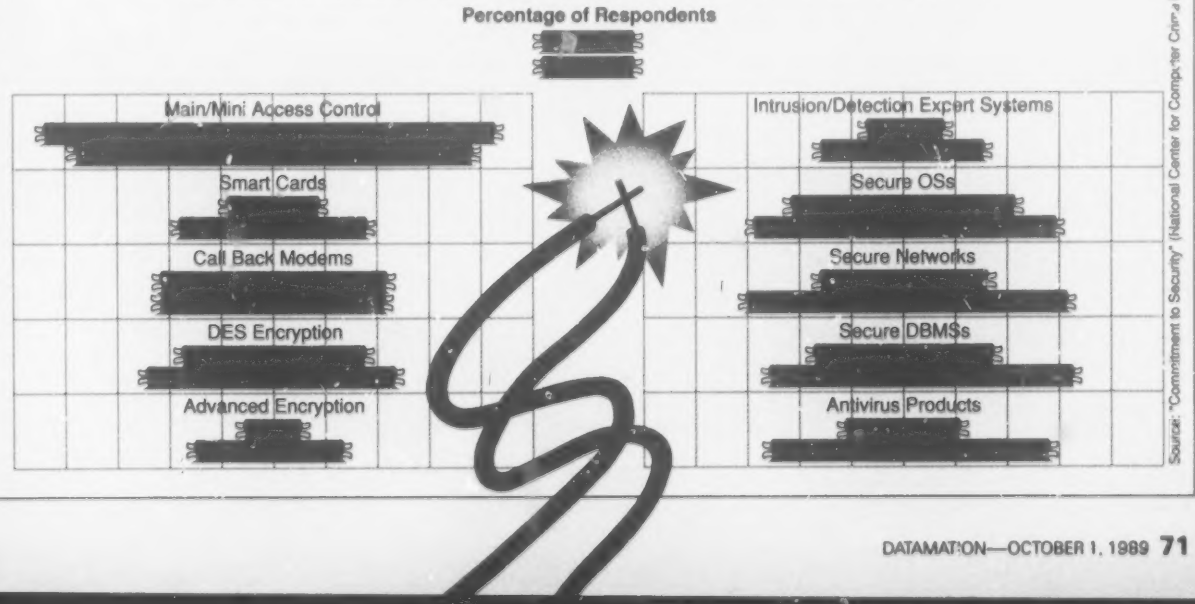
The extent of computer crime and the myriad of forms it takes preclude any single method guaranteeing protection. A recent survey of 3,500 computer security professionals by the National Center for Computer Crime Data (NCCCD) in Los Angeles estimates the annual losses from computer abuse, nationally, at $555,464,000. Of the survey respondents, the average installation experienced losses of $109,000, 365 person hours and 26 hours of computer time.

The survey also detailed nine types of computer crime—money theft, information theft, damage to software, malicious data alteration, deceptive data alteration, theft of services, harassment, extortion and damage to hardware. Telephone services were the most common service theft, with computer services constituting much of the remainder. Theft of services experienced the biggest jump in occurrence—24%—from the previous survey.

Nevertheless, there are as many avenues of thwarting computer crime as

Technology Safeguards Against Crime

In warding off computer crime, the use of mainframe/mini access control products is projected to drop by 1991, as demand for several other products, including smart cards and antivirus software, doubles.



Source: "Commitment to Security" (National Center for Computer Crime Data).

there are types of computer crimes. In determining which way to go, it is most helpful to consider some of the standards and practices in use among other computer professionals.

Donn Parker, a leading computer security consultant at SRI International in Menlo Park, Calif., studied the practices of a city, a county and a state data-processing service organization; a criminal justice research institute; a large insurance company; and two university data-processing centers. He devised a set of generally used controls that should be present in every well-run computer center (see table, "The Well-Secured Computer Center"). They were detailed in *Computer Security Techniques*, a 1982 publication of the U.S. Department of Justice Bureau of Criminal Justice Statistics.

Top Management Commitment

Though it was written seven years ago, Parker says the categories of baseline practices haven't changed, but 50 or 60 new practices have been added. These practices include the separation of duties, such as prohibiting application developers from administering the application; the "aging" of trash, where a firm holds onto its trash for 24 or 48 hours so nothing important is thrown out; and using daily code words for voice communications systems. One bank, which was aging its trash, was able to rescue $12 million worth of unprocessed checks that had been thrown out. Managers who choose not to implement these types of controls, Parker adds, will have to justify their action if challenged by upper management over a system failure.

The computer security professionals responding to NCCCD's survey, "Commitment to Security," ranked top management commitment to security the most important and valuable component of a general security strategy.

David Johnson, a lawyer with Washington D.C.-based Wilmer, Cutler & Pickering and author of a white paper on the legal issues involved with computer viruses, concurs with NCCCD's assessment. He recommends that corporations and other institutions consider security issues thoughtfully at their highest policy levels and adopt a set of preventive measures. These include enforceable policies for employee or student use and an emergency action plan that will minimize damage.

☐ THE AVERAGE IS SHOP LOST $109,000, 365 PERSON HOURS AND 26 HOURS OF COMPUTER TIME.

Security Guidelines

Other components of a security strategy, ranked in order of importance by NCCCD's survey respondents, are establishing corporate ethical norms for computer use, maintaining employee awareness and training, enforcing computer crime laws, securing communications and electromagnetic emanations and controlling physical access.

IS managers may find other complementary ideas for securing their systems in the security guidelines and standards developed by the National Institute for Science and Technology (NIST), formerly the National Bureau of Standards. These are among the Federal Information Processing Standards (FIPS), which the agency issues in all areas of computer use.

Steward Katzke, chief of the Computer Security Division at NIST, describes the FIPS as "good practices." "If neither they nor a comparable alternative are used," he adds, "it will be up to the user to explain why not."

Under the Computer Security Act of 1987, government users with "sensitive" information in their computers have no choice but to develop a computer security plan and to submit it to NIST. The express goal of the act is to ensure that agencies move toward more standardized government computer security practices. As of March 1989 NIST had received about 1,500 plans. Next, the agencies will have to implement the plans and train their personnel in computer security.

The NCCCD survey responses also show that security professionals are constantly changing the types of technologies they use to fend off any cracks in system security (see chart, "Technology Safeguards Against Crime"). Use of mainframe and minicomputer access controls, for example, rose to 85% in 1988 from 61% in 1985, but is expected to drop 10% by 1991.

In contrast, many other technologies and products, including smart cards, advanced encryption, intrusion detection expert systems, secure networks and antivirus products will be much more widely used in 1991 than in 1988.

Consequences of Inaction

Stan Stahl, the center's director of research, says: "The results of our survey demonstrate what others are doing to protect against various types of computer security violations. There is no escaping the need to keep abreast of other managers' practices, particularly those with similar vulnerabilities or in the same industry."

Attorney Johnson adds, "An institution that doesn't take the computer crime threat seriously and consider reasonable policies to reduce its risk will face a higher risk of litigation and be less well able to answer a claim that the institution had not acted responsibly to avoid the risk." ▭

J.J. BloomBecker is an attorney and director of the National Center for Computer Crime Data, Los Angeles.

The Well-Secured Computer Center

IS managers should consider adopting some or all of the seven types of general computer security controls:

- Manual assurance of data integrity—destroy discarded documents, eliminate incomplete and obsolete data.
- Physical security—keep a low profile for the computer center, prohibit smoking and eating in some computing areas.
- Operations security—isolate sensitive computer production duties, protect data used in system testing, set up disaster recovery policies, document courier trustworthiness and identification.
- Management-initiated controls—appoint a computer security management committee and officer, keep security reports confidential.
- Computer program development and maintenance controls—set up quality assurance procedures and access control for programming library.
- Computer system controls—set up technical review of operating system changes, cryptographic protection and input data validation.
- Computer terminal access controls—set up terminal identifiers and protocols for login.

Source: *Computer Security Techniques* (U.S. Department of Justice).

Industry Performance Update: Health Care and Financial Services

Both the financial services and health care industries hold potential for IS growth.

BY MADELINE FRANCHI

The catch phrase for the 1990s just might be, "Don't trust anyone under the age of 30." If so, it will be a result of the quiet revolution now occurring in population demographics. More than 80% of the projected increase in the population between 1986 and 2000 will take place among those aged 45 and older. With the aging population will come a significant increase in chronic afflictions and thus a greater need for health care services.

Last year alone, consumers spent $404 billion on medical care services, not including the billions spent annually on prescriptions and over-the-counter drugs. That spending rate represents an increase of just over 12% in one year, Cahners Economics expects similar increases in both 1989 and 1990.

Of course, a big chunk of that increase was the result of rising medical costs. Price increases for medical care services have been running over 6% in the last two years, and Cahners expects rises of over 7% this year and next.

In addition to the increased demand for health care and the rising cost of medical services, complicated Medicare/Medicaid accounting is contributing to rising expenses, making the IS department a critical component in the strategy to improve the quality and efficiency of our health care delivery system. According to the latest DATAMATION Budget Study (April 1, 1989, p. 18), the mean budget for these IS departments is expected to rise from $1.88 million last year to $1.98 million this year, an increase of 5.3%, as compared with an increase of 4.4% for IS budgets in general. The average number of employees in the IS department of health care organizations is estimated to increase from 28.3 in 1988 to 30.5 in 1989.

In some cases, budgetary squeezes or the shift toward distributed processing has reduced the size of the IS staff. However, over one-third of the health care companies surveyed noted that the development of mission critical applications and the recognition that information technology will play a crucial role in the company's future have motivated increases in staff sizes and budgets.

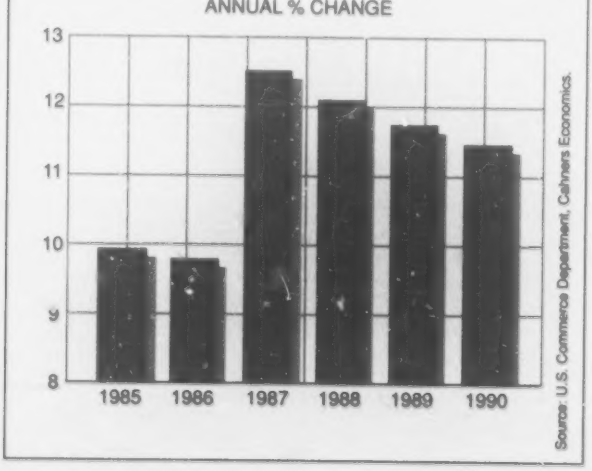
Automation and information technology are making significant contributions to the finance, banking and insurance industries. According to a U.S. Department of Labor report, output per employee in the commercial-banking area increased 30% from 1967 to 1985 (the last year for which statistics are available), with a 7% rise between 1983 and 1985 alone.

The latest technology drive is not just for automated teller machines, either. Market research from Frost & Sullivan Inc. says that the greatest potential for branch banking automation systems appears to be for mortgage and commercial loan origination, product presentation and customer profitability analysis, with respective increases of 52%, 51%, 49% and 48% over the next five years. This is expected to occur as financial institutions begin relying on their branch operations to take on more of a marketing role.

From 1988 through 1992, Frost & Sullivan predicts the banking industry will invest $6.4 billion in teller station terminals, administration terminals, workstations and other IS equipment. Bank holding companies will be responsible for the largest single portion of those funds, laying out 49% of the dollars, followed by savings institutions, at 25%.

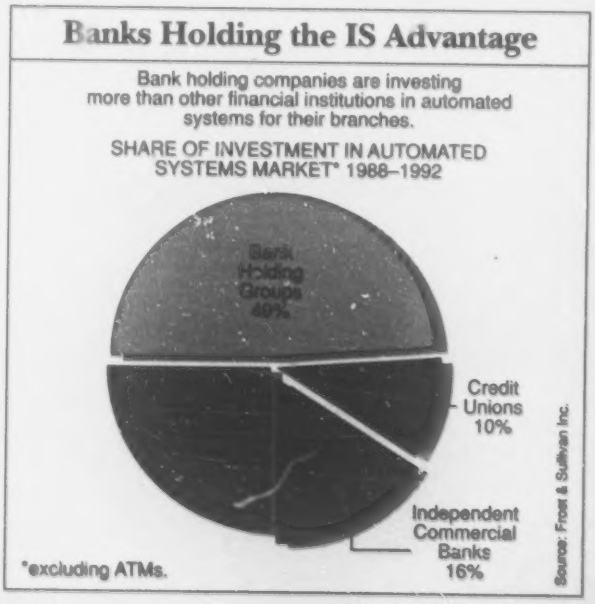
Spending for Medical Care Services

Sharp rises in heath care costs in the past are fueling IS growth this year.



Banks Holding the IS Advantage

Bank holding companies are investing more than other financial institutions in automated systems for their branches.


SHARE OF INVESTMENT IN AUTOMATED SYSTEMS MARKET* 1988–1992
Bank Holding Groups 49%
Credit Unions 10%
Independent Commercial Banks 16%
*excluding ATMs.
Source: Frost & Sullivan Inc.